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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,878	08/22/2001	Shao-Hua Guo	01-2580A	9259

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EXAMINER

PRICE, ELVIS O

ART UNIT	PAPER NUMBER
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1621

DATE MAILED: 07/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/934,878

Applicant(s)

GUO ET AL.

Examiner

Elvis O. Price

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,3-11 and 14-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-11 and 14-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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### **DETAILED ACTION**

1. Claims 1, 3-11, and 14-18 are pending in the application, claims 2, 12 and 13 having been cancelled by applicants' amendment filed 4/11/03.
2. Applicants' amendment, filed 4/11/03, has over come the 35 USC 102(b) rejection, issued in the office action dated 1/14/03.

### ***Information Disclosure Statement***

The information disclosure statement, filed 1/3/02, complies with the provisions of 37 CFR 1.97, 1.98 and MPEP02 § 609. It has been placed in the application file, and the information referred to therein has been considered as to the merits.

### ***Claim Objections***

Claims 1, 14, 15 and 16 are objected to because of the following informalities:  
The general structure representing the allylic alcohol (in Claims 1 and 16) is chemically incorrect. The carbon with the "R" group has 5 bonds instead of 4 (perhaps the hydrogen was inadvertently included). Claims 14 and 15 depend from claim 12, however, claim 12 has been cancelled by applicants' amendment filed 4/11/03.  
Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1, 3-11 and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo {US Pat. 5,475,073}, in view of Guo et al. {US Pat. 6,127,500} and further view of Aldrich (Catalog Handbook of Fine Chemicals, Aldrich Chemical Company, 1992-1993).

Applicants claim a process for making an acrylic polyol, said process being performed essentially in the absence of styrene, methyl acrylate and methyl methacrylate, and comprising:

(a) initially charging a reactor with an allylic alcohol, 0-50% of the total amount to be used of a C<sub>2</sub>-C<sub>20</sub> alkyl or aryl acrylate or methacrylate monomer and 0-100% of the total amount to be used of a free-radical initiator;

(b) heating the reactor contents to 100-250° C or to reflux; and

(c) gradually adding to the reactor the remaining acrylic monomer and initiator;

wherein the allylic alcohol has the general structure: CH<sub>2</sub>=CHR-CH<sub>2</sub>-(A)<sub>n</sub>-OH in which R is hydrogen, a C<sub>1</sub>-C<sub>10</sub> alkyl, or a C<sub>6</sub>-C<sub>12</sub> aryl group; A is an oxyalkylene group; and n, which is an average number of oxyalkylene groups, is within the range of 1 to about 5; and wherein the process gives a total monomer conversion greater than about 90%.

Guo teaches a process for making an acrylic polyol, comprising copolymerizing an allylic alcohol or propoxylated allylic alcohol with a C<sub>1</sub> to C<sub>20</sub> alkyl or aryl acrylate or methacrylate monomer in the presence of a free-radical initiator (Col. 3, lines 53-60).

Guo teaches that the reaction temperature of their process is generally from about 60° C to about 300° C (Col. 4, lines 40-45) and all or some of the acrylic monomer(s) and initiator of the Guo process are gradually added during the course of the reaction (see

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Col. 3, lines 61-67; Col. 4, lines 27-31 and Example 3). Guo teaches that the preferred allylic alcohols used in his invention are, inter-alia, mono- or di-propoxylated allylic alcohols of the general formula,  $\text{CH}_2=\text{CR}-\text{CH}_2-(\text{A})_n-\text{OH}$  (R is Hydrogen or  $\text{C}_1-\text{C}_5$  alkyl; A is an oxypropylene group and n is less than or equal to 2) (Col. 2, lines 32-47). Guo teaches that the acrylic polyol prepared, in Example 3, has a number average molecular weight of 1560 and a weight average molecular weight of 4800, which constitutes a molecular weight distribution of 3.07. Guo's acrylic polyol of Example 3 has a hydroxyl number of 120 mg KOH/g. The difference between the presently claimed invention and what is taught in the Guo reference is that the Guo reference is silent with regard to, (1) heating the reactor contents to reflux, (2) the free-radical initiator containing less than 30 weight percent of water, (3) total monomer conversion of greater than 90%, and (4) acrylic polyol(s) having a molecular weight distribution less than about 2.5. However, since the Guo teaches a process for preparing acrylic polyols from reacting allyl alcohols and acrylic monomers, under reaction conditions which anticipate or encompass the presently claimed reaction conditions (e.g., broad reaction temperature range up to  $300^0\text{ C}$ , type and amount of monomer used, type of initiator, etc.), it would be reasonable for one having ordinary skill in the art to expect that the heating of the reactor contents to reflux, obtaining a total monomer conversion of greater than 90% and producing acrylic polyol(s) having a molecular weight distribution less than about 2.5 would be realized from Guo's invention (generally taught process for preparing acrylic polyols). Additionally, di-tertiary-butylperoxide is used as the free-radical initiator in

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Example 3 of Guo's invention. Di-tertiary-butylperoxide (98% solution) is a commercially available solution that contains less than 30% of water (Aldrich, pp. 237).

Guo et al. (US Pat. 6,127,500) teach that the acrylic polyol resins prepared in the US Pat. 5,475,073, cited above, have low molecular weights and molecular weight distributions less than 3. Guo et al. teach that the said acrylic polyol resins disclosed in US Pat. 5,475,073 are valuable reactive intermediates for making high-performance coatings and other thermoset polymers (see Col. 1, lines 41-57 of 6,127,500 patent).

It would have been *prima facie* obvious to one having ordinary skill in the art, in view of the Guo and Guo et al. references, to prepare acrylic polyols as presently claimed because Guo teaches a process for preparing acrylic polyols from reacting allyl alcohols or propoxylated allylic alcohol and acrylic monomers in the presence of a free-radical initiator, wherein the acrylic monomers used are C<sub>1</sub> to C<sub>20</sub> alkyl or aryl acrylate or methacrylate monomers, heating the reactants at from about 60° C to 300° C before gradually adding to the reaction mixture the remaining acrylic monomer and initiator.

One having ordinary skill in the art would have been motivated, in view of the teachings in the Guo (US pat. 5,475,073) and Guo et al. (US Pat. 6,127,500) references, to prepare acrylic polyols as presently claimed because one having ordinary skill in the art would have been motivated to optimize the reaction conditions of the Guo process to affect optimum monomer conversion so as to afford an optimum yield of acrylic polyol product. The skill artisan, desiring to prepare acrylic polyol resins that are valuable intermediates for making high-performance coatings and other thermoset polymers, would have also been motivated to vary the reaction parameters of the Guo

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process so as to afford other art recognizable acrylic polyol resins having low molecular weights and molecular weight distributions less than 3. The instantly claimed invention would have been therefore obvious to one having ordinary skill in the art.

### ***Response to Arguments***

Applicants' arguments filed 4/11/03 have been fully considered but they are not persuasive.

Applicants argue that the Guo reference does not teach or suggest a process in which the total monomer conversion is greater than 90% and/or a process that uses allyl alkoxylate but not allyl alcohol.

This argument is not convincing because Guo expressly teaches that the preferred allylic alcohols used in his invention are, inter-alia, mono- or di-propoxylated allylic alcohols (the same allylic alcohol as required by the present claim 16) of the general formula,  $\text{CH}_2=\text{CR}-\text{CH}_2-(\text{A})_n-\text{OH}$  (R is Hydrogen or  $\text{C}_1-\text{C}_5$  alkyl; A is an oxypropylene group and n is less than or equal to 2) (Col. 2, lines 32-47). Although Guo does not explicitly teach a total monomer conversion of greater than 90%, it would be reasonable for one having ordinary skill in the art to expect that obtaining a total monomer conversion of greater than 90% would be within the experimental expertise of one having ordinary skill in the art since the Guo teaches a process for preparing acrylic polyols from reacting allylic alcohols (such as propoxylated allylic alcohols) and acrylic monomers, under reaction conditions which anticipate or encompass the presently claimed reaction conditions (e.g., broad reaction temperature range up to  $300^\circ\text{C}$ , type and amount of monomer used, type of initiator, etc.).

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Applicants argue that their invention (claim 16) requires that the polymerization is conducted at reflux temperature and the polymerization is almost always conducted in a sealed reactor under pressure in the Guo and Guo et al. references.

This argument is not convincing because (1) applicants claim language is not limited to conducting the polymerization in an open reactor, (2) the Guo and Guo et al. references neither teach nor suggest that their polymerization cannot be carried out in an open reactor and (3), carrying out the polymerization in a sealed reactor does no way imply that the polymerization is not being conducted at reflux temperature(s). In fact, Guo and Guo et al. teach a broad temperature range (60° C to 300° C) at which the polymerization can be carried out. Thus, one having ordinary skill in the art, in view of the Guo and Guo et al. references, would envisage carrying out the polymerization at temperatures which would be considered reflux temperatures).

Applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

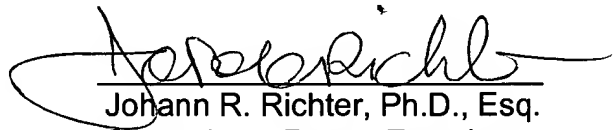
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elvis O. Price whose telephone number is 703 605-1204. The examiner can normally be reached on 8:30 am to 5:00 pm; Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann R. Richter can be reached on 703 308-4532. The fax phone numbers for the organization where this application or proceeding is assigned is 703 308-4556.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-1235.

Elvis O. Price, Ph.D.

July 9, 2003

  
Johann R. Richter, Ph.D., Esq.  
Supervisory Patent Examiner  
Technology Center 1600